

hardened, as did those which have not yet given the imago. This fact I noticed at the time, and kept watch of the chrysalids thinking that they might be going to decay.

Out of 55 chrysalids which I kept for myself only these three gave the butterfly, yet out of doors there were very many freshly emerged butterflies from August 16th until September 20th. and these butterflies oviposited as plentifully as the earlier ones, giving larvae which pupated in October, the last one I know about pupating on October 20th. I found small leaves of caraway bearing six, nine, thirteen, and fifteen eggs each, in different stages of development, as shown by their color. One butterfly only I saw lay two eggs on the same leaf, and these two were on different divisions of the leaf, one being on the under side, the other on the up-

per side and close against another egg which had turned almost orange in color.

From watching the ovipositing I feel convinced that the butterfly does not see clearly, but depends very much on its antennae to distinguish between such plants as tansy and caraway. Several times a butterfly would fly to the low tansy leaves growing close by the caraway, and bend its abdomen to place the egg, when it would hesitate, touch the leaf with its antennae, and fly to another plant. If this proved caraway the egg would be laid.

The nearly full fed larvae preferred the green seeds of the caraway to the leaves.

Of all the larvae I reared from the egg or took from plants out of doors only one died, and that was stung by a tachinid.

PSEUDOPOMALA AND ITS ALLIES.

BY SAMUEL H. SCUDDER, CAMBRIDGE, MASS.

Pseudopomala was founded by Morse on an anomalous Acridian of New England (since found as far west as Utah) having a *Tryxaline* aspect, and which he placed in that subfamily and in this was followed by McNeill. On account of the distinct though slight pyramidal elevation on the prosternum I have since placed it in the *Mesopes*, a group otherwise confined to the Old World. It bears a close general resemblance to the oriental *Gelastorhinus*

Sauss., has a similar low prosternal spine, and an unmistakable *Tryxaline* aspect, due largely to the tricarinate pronotum and ensiform antennae, which it shares also with *Opomala*.

My opinion of its affinities has been strengthened by finding in our country another allied genus, whose type is *Mesops cylindricus* Brun., which has a similar prosternal prominence and in which the principal distinction from *Pseudopomala* lies in the absence of

lateral carinae on the pronotum and its consequent much closer resemblance to the Leptysmæ. It also possesses the rasp on the hind femora of the male, noted by Morse in *Pseudopomala*. The two genera may be separated by the following table:—

*a*¹. Plane of lateral foveolæ of the vertex inflexed; eyes subacuminate above, broadest below the middle; pronotum with distinct lateral carinae in both sexes; mesothoracic lobes short, well separated *Pseudopomala* Morse.

*a*². Plane of lateral foveolæ of the vertex depressed but vertical; eyes regularly elliptical, almost or quite as rounded above as below, broadest at the middle; pronotum with no lateral carinae or they are found feebly on the metazona of the male; mesothoracic lobes moderately long, attingent or subattingent *Paropomala*, gen. nov.

I have before me three species belonging to this latter type, all coming from the western half of the United States. They may be thus separated:—

*a*¹. Tegmina not reaching tip of abdomen or even tip of hind femora; subgenital plate of male elongate, half as long again as the last ventral segment.

*b*¹. Testaceous; antennæ of female as long as the hind femora; median carina of pronotum rather coarse; mesothoracic lobes rugulose

cylindrica Brun.

*b*². Green or pallid; antennæ of female shorter than the hind femora; median carina of pronotum very delicate; mesothoracic lobes smooth

calamus sp. nov.

*a*². Tegmina reaching tip of abdomen and surpassing hind femora; subgenital plate of male not very long, no longer than the last ventral segment

virgata sp. nov.

Mezops wyomingensis Thom. also belongs to this genus, if indeed it is to be distinguished from *P. cylindrica*. It comes from Wyoming.

The first of these three species (*Mezops cylindricus* Brun. Proc. U. S. nat. mus. xii, 48-49, 1890) I have seen only from Valentine, Nebr. (Bruner) and Fort Collins, Colo. (Baker). *Paropomala calamus* is from Lancaster, Cal., Aug. 1 (A. P. Morse); I have only seen 2 ♂, 1 ♀. It is the slenderest form of the three, of a pale green color with a slender hoary stripe running backward from the lower edge of the eye, bordering narrowly the lower edge of the pronotum. Of *Paropomala virgata* I have before me nearly a hundred specimens collected by A. P. Morse at Mesilla, N. Mex., June 29; between Gila Bend and Yuma, Ariz., July 4; and in California at Palm Springs on bunch grass, July 12, Cahon Pass, July 10, Lancaster Aug. 1, and Kern City, Aug. 4. Generally of a pale green color with a tendency to becoming cinereous above, it varies greatly from having the sides of the head, pronotum and thoracic pleura wholly green to their being chalky white on lower and dark fuscous on upper half, sharply delimited; most commonly the upper half is more or less infuscated and the lower half pale testaceous or sordid white; the anten-

nae are commonly ferruginous or ferrugineo-testaceous. Immature specimens of one or the other species were also taken in California at Colton July 17

and Los Angeles July 26. According to Mr. Morse *P. virgata* flies only a little but leaps fairly well notwithstanding its slender legs.

LIFE HISTORIES OF NORTH AMERICAN GEOMETRIDAE.—VII.

BY HARRISON G. DYAR, WASHINGTON, D. C.

Mesolenca intermediata Guen. This larva has not been previously described.

Egg. Regularly elliptical, one end slightly truncate, but roundedly; from side view somewhat wedge-shaped, the truncate end the thicker; surface covered with flattened elongate hexagonal cell-areas, making it a many-sided polyhedron, the areas scarcely at all sunken; size .7 x .55 x .3 mm.

Stage I. Head round, whitish, eye black, mouth brown; width about .3 mm. Body slender cylindrical, colorless, transparent, food dark green. No tubercles nor shields perceptible; setae short and fine, obscure, pale. No marks, the skin slightly shining; segments slightly moniliform, joint 10 a little widened at the sides, but not marked.

Stage II. Head pale yellowish, eye black, mouth brown; width about .5 mm. Body smooth, slightly shining, transparent, all dark green from the food, tracheal line white. No marks and no perceptible tubercles or setae, which under a strong lens are fine and small, the tubercles colorless.

Stage III. Head round, about as high as joint 2, not bilobed, dull yellowish, the setae distinct, pale; ocelli black; width about .85 mm. Skin transparent, yellowish, the central part of the body light brown by transparency, till filled with food when all appears dark green. Tracheal line white; feet clear yellowish; no marks. Setae moderately long, fine, dusky; tubercles small, colorless; spiracles brown. Later there are faint, nar-

row, whitish addorsal and subdorsal lines between which a dorsal white shade appears, joining them.

Stage IV. Head rounded, the apex under joint 2, translucent luteous, a broad black band to apex of each lobe before ocelli; width 1.4 mm. Body very pale ochereous brown, marked with irregular shades of brown-black. A narrow dorsal line, edged by the whitish addorsal one; subdorsal line whitish, edged above by black; a waved, geminate lateral brown line; a few faint ventral streaks and double intersegmental spots. Dorsally a series of large patches on joints 6, 7, 8 and 9 posteriorly. The first is a spot on each side of the dorsal line behind a widening of that line; the second has these marks united into a V; the others are large patches extending between tubercles i and ii notched before and behind. A heavy lateral shading on thorax; also dorsal dots, formed by the widening of the dorsal line on the anterior edges of joints 6 to 9; a dark dot at tubercle ii of joint 10 and a heavy shade over the sides of joints 10 to 13 and on the foot of joint 10. Posterior half of the foot of joint 12 and the anal plate pale. Setae fine, pale; the venter has six obscure, whitish, longitudinal lines.

Cocoon a slight web in the ground.

Larvae from Chain Bridge, Virginia. Eggs June 30th, mature larvae July 17th and imagoes again July 30th.

Food plant. Jewel weed (*Impatiens*.)